



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

OFFICE OF  
PREVENTION, PESTICIDES AND  
TOXIC SUBSTANCES

MEMORANDUM

Subject: Review of Methoprene Data Package Submitted by Zoecon Corp.

From: *for* Anthony F. Maciorowski, Chief *Douglas H. Hutton*  
Ecological Effects Branch  
Environmental Fate and Effects Division (7507C) 11/30/84

To: Phillip Hutton, Team Leader  
Biopesticides and Pollution Prevention Division

Data Evaluation Records (DER) have been completed for two aquatic invertebrate studies submitted by Zoecon Corp. These studies are listed below, along with a synopsis of the Ecological Effects Branch (EEB) conclusions.

**CITATION:** D. C. Suprenant. 1985. Acute Toxicity of S-Methoprene Technical to Daphnids (*Daphnia magna*). Project No. 10828.0884.6102.110. Prepared by Springborn Bionomics, Inc. Aquatic Toxicology Laboratory, Wareham, MA. Submitted by Sandoz Agro, Inc., Denton Dr., Dallas, TX. EPA MRID No. 43163301.

This study is classified supplemental due to too few animals per test concentration and lack of reporting of residues of s-methoprene at the end of the study. Based on measured concentrations at day 0, the reported 48-hour LC<sub>50</sub> for s-methoprene to *Daphnia magna* is 360 ppb.

**CITATION:** L. Brooke. 1988. Final Report to the Metropolitan Mosquito Control District on the Effects of Insect Control Agents, S-Methoprene and *Bacillus thuringiensis israelensis* to Certain Aquatic Organisms. Center for Lake Superior Environmental Studies. University of Wisconsin-Superior, Superior, WI 54880; Submitted by Sandoz Agro, Inc., Denton Drive, Dallas, TX., MRID 43163306.

A separate DER was prepared for a laboratory acute freshwater invertebrate toxicity study contained in this final report. The study was deemed scientifically sound and classified



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core. Based on mean measured concentrations, the 48-hour LC<sub>50</sub> for s-methoprene to *Daphnia pulex* is 71 ppb (95% C.I. = 67-75).

The EEB has an acceptable acute invertebrate toxicity study on file: 1991 RED, LeBlanc (1975), MRID 00010388, 48-hour LC<sub>50</sub> to *Daphnia magna*, 89 ppb. This study has been reclassified to supplemental due to too few animals per test level (15 instead of 20) and lack of information on whether the concentrations of s-methoprene were analyzed in the test concentrations. The LC<sub>50</sub> value derived from this study is similar to that reported in the University of Wisconsin-Superior lab study, but much more conservative than Springborn's reported value. Zocon should be informed that the EEB will use the 71 ppb value as a basis for conducting future aquatic risk assessments for methoprene. EEB's policy is that where several scientifically sound studies are available, the most conservative value is used as a basis for computations in risk assessments.

The EEB reviewed the report entitled "Interim Report of the Scientific Peer Review Panel of the Metropolitan Mosquito Control District to the Minnesota Environmental Quality Board" dated May, 1993. This report was a synopsis of MRIDs 43163302 through 43163310. The studies listed below were referenced in the interim report, but MRIDs were not provided to EEB for review.

Evaluation of the Potential Effects of Methoprene and Bti (*Bacillus thuringiensis israelensis*) on Non-target Organisms: A Summary of Before-and-after Sites in Western Wright County for 1988, 1989, and 1990. Niemi, G. et al, Natural Resources Research Institute, University of Minnesota, Duluth, Minnesota, July, 1992.

Mallard Duckling Growth and Behavior in Methoprene Treated Wetlands: 1989 Final Report. Cooper, J.A. et al, Dept. of Fisheries and Wildlife, College of Natural Resources, U. of Minnesota, St. Paul, MN 1989.

MRIDs 43163302 through 43163310 were not reviewed, except that a DER was prepared for a lab study contained in MRID 43163306. These studies were non-guideline submissions consisting generally of summary data or progress reports. A synopsis of the study author conclusions is provided below.

**CITATION:** G. J. Niemi. 1992. Evaluation of the Potential Effects of Methoprene and Bti (*Bacillus thuringiensis israelensis*) on non-target organisms: A Progress Report on Data Gathered for 1988 to 1992. Natural Resources Research Institute and Department of Biology, U. of Minnesota, Duluth, MN.; Submitted by Sandoz. Agro, Inc., Denton Drive, Dallas, TX., MRID 43163302.

This submission consists of a table summarization of the results of data gathered during ongoing studies (1988-1992) to determine the effects of methoprene/Bti on non-target organisms. The author drew no conclusions from the data gathered.

**CITATION:** G. I. Scott. 1986. The Acute Toxicity of Chemical Larvicide (Temephos, Fenoxycarb, Diflubenzuron, and Methoprene) and a Microbial Larvicide (Bacillus thuringiensis israelensis) Used for Mosquito Control on 3 Nontarget Estuarine Organisms. Dept. of Environmental Health Science. U. of South Carolina, Columbia, SC., Submitted by Sandoz. Agro, Inc., Denton Drive, Dallas, TX., MRID 43163303.

This submission consists of a research summary of the results of acute toxicity tests using various larvacides on common estuarine species. Reported 96-hr LC<sub>50</sub> values for methoprene were 125 mg/L and 112 mg/L for mummichog and grass shrimp, respectively. A 96-hr LC<sub>50</sub> for fiddler crab was not reported for methoprene. DERs could not be prepared for these studies since they were research summaries.

**CITATION:** R. Leclair. 1988. Progress Report to the Metropolitan Mosquito Control District on the Effects of the Insect Control Agent, (Bacillus thuringiensis israelensis) (B.t.i.), to Some Larval Amphibian Species. Groupe de Recherche sur les Insectes Piqueurs (GRIP), U. de Quebec a Trois-Rivieres, C.P. 500, Trois-Rivieres, Quebec, G9A 5H7, Submitted by Sandoz. Agro, Inc., Denton Drive, Dallas, TX., MRID 43163304.

This submission consists of the results obtained from tests conducted on tadpoles fed mosquito larvae contaminated with Bti. No data on methoprene were contained in the report.

**CITATION:** A. Hershey. 1991. Effects of Methoprene and Bti (Bacillus thuringiensis var. israelensis) on Non-target Invertebrates: A Divided Pond Study. Natural Resources Research Institute and Department of Biology, U. of Minnesota, Duluth, MN.; Submitted by Sandoz. Agro, Inc., Denton Drive, Dallas, TX., MRID 43163305.

This submission consists of the results of a field study using methoprene/Bti conducted in three temporary woodland pools in Lake Maria State Park, Wright Co., MN. The author concluded there was little evidence of adverse effects to aquatic or zooplankton communities from methoprene application, but there was a need for a more extensive study of these communities on "before-and-after" sites. Problems with this study included variable measurements of methoprene concentrations (including false positives indicative that either ponds were incorrectly

dosed or there was a compound(s) coeluting almost identically with methoprene) and low sample size was for zooplankton, aquatic insects and eubranchiopods.

**CITATION:** L. Brooke. 1988. Final Report to the Metropolitan Mosquito Control District on the Effects of Insect Control Agents, S-Methoprene and Bacillus thuringiensis israelensis to Certain Aquatic Organisms. Center for Lake Superior Environmental Studies. University of Wisconsin-Superior, Superior, WI 54880; Submitted by Sandoz. Agro, Inc., Denton Drive, Dallas, TX., MRID 43163306.

This submission consists of a summary of the results of laboratory acute/chronic toxicity tests using methoprene/Bti. Reported 48-hr EC<sub>50</sub> values for s-methoprene to Daphnia pulex were 78 µg/L (Test 1) and 71 µg/L (Test 2) and 112 mg/L to the leopard frog, Rana pipiens. Based on a 21-day exposure of s-methoprene to Daphnia pulex, the NOEC was 4 ug/L and the LOEC was 7 ug/L (geometric mean 5 ug/L). A separate DER was prepared for the acute daphnid study (Test 2). DERs were not be prepared for Test 1 or the chronic test due to excessive mortality in the controls.

**CITATION:** C. Fortin. 1988. Laboratory Study of the Impact of Slow Released Methoprene on Selected Freshwater Crustacean Species. Dept. of Environmental Biology, U. of Guelph, Guelph, Ontario; Submitted by Sandoz. Agro, Inc., Denton Drive, Dallas, TX., MRID 43163307.

This submission consists of the results of laboratory studies on the impact of slow released methoprene on selected freshwater crustacean species. The author concluded that the test organisms (Daphnia pulex, Hyallela and Diaptomus) should not be affected under field application. DERs were not prepared for these laboratory studies since pertinent information was lacking (i.e. raw and analytical data).

**CITATION:** M. J. DeJong. 1989. The Indirect Effects of the Larvicide Methoprene and Bacillus thuringiensis on Wetland Bird Populations. Dept. of Biology. College of St. Thomas. St. Paul, MN 55105; Submitted by Sandoz. Agro, Inc., Denton Drive, Dallas, TX., MRID 43163308.

This submission consists of the results of a field study designed to determine whether treatment of wetland sites with methoprene/Bti would adversely affect passerine birds populations. The author drew no study conclusions citing problems with site selection and lack of bird populations.

**CITATION:** G. Niemi. 1990. Evaluation of the Effects of

Methoprene and BTI (Bacillus thuringiensis israelensis) on Non-target Species and Communities: Historically Treated Sites in Eastern Wright County. Natural Resources Research Institute and Dept. of Biology. U. of Minnesota, Duluth, MN.; Submitted by Sandoz. Agro, Inc., Denton Drive, Dallas, TX., MRID 43163309.

This submission consists of a summary of preliminary field work on 50 wetlands located in Wright County, MN for assessment of potential effects of methoprene/Bti on non-target organisms. The author concluded that treatment of methoprene did not have major impacts on the ecology of red-winged blackbirds or zooplankton, but no conclusions could be drawn for aquatic insects. Problems with the study included a small number of sampling dates, short and variable treatment histories of the treated sites, low numbers of organisms collected, and extensive natural variations among the sites which gave the study a low power to detect small effects (cited from MMCD May, 1993 Interim Report).

**CITATION:** C. S. Charbonneau. 1991. Effects of a Mosquito Control Practice Using Bacillus thuringiensis var. israelensis on Waterfowl Invertebrate Food Resource. Missouri Cooperative Fish and Wildlife Research Unit, School of Natural Resources, University of Missouri, Columbia, MO. College of St. Thomas. St. Paul, MN 55105; Submitted by Sandoz. Agro, Inc., Denton Drive, Dallas, TX., MRID 43163310.

This submission consists of the results of field and laboratory studies conducted to determine the effects of Bti on waterfowl macroinvertebrate food resources. No data on methoprene were contained in this report.

If you have any questions concerning this memo or attached DERs, please contact Joanne Edwards. She may be reached at (703) 305-6736.